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The international efforts of France to secure radioactive sources

Working paper submitted by France

Radioactive sources are used in a great variety of civilian applications in agriculture,[1] industry,[2] medicine,[3] archaeology[4] and scientific research. Millions of such sources are currently in use worldwide. Of these, some are said to be *high-activity*, due to the high levels of radiation they emit, which can cause serious injury or death in the event of overexposure.

Despite the undertaking of many international projects since the end of the 1990s, the security of radioactive sources currently receives much less attention than that of nuclear materials; and yet, because of the uses to which they are put, they are often found in facilities (hospitals, laboratories, small and medium enterprises, universities etc.) that are less secure than those where nuclear materials are stored. Hence, they are more vulnerable and, given their relative ease of handling, are more likely to be used by terrorists to produce a radiological dispersal device or "dirty bomb".

Considering how many such sources are found in States lacking sufficient means to ensure their safety in compliance with IAEA recommendations, the risk of malicious use of high-activity sources is seen today as one of the greatest security risks associated with nuclear technologies in the broad sense.

At the Nuclear Security Summit of 24–25 March 2014, the President of the French Republic announced that France would be stepping up its efforts to secure high-activity radioactive sources, essentially through a threefold approach: strengthen the applicable international framework; encourage the phasing out of technologies using high-activity sources in favour of alternative technologies; and

[1] Sterilization of fruit, vegetables, cereals, meat or fish, to eliminate micro-organisms, bacteria, parasites, microbes etc.

[2] High-precision measurements (temperature, weight, size etc.), smoke detection, industrial radiography (conformity of mechanical parts, welds and structures etc.), leak detection, supply of energy to satellites or isolated equipment (by RTGs) etc.

[3] Sterilization of equipment and instruments, elimination of insects (e.g. tsetse flies), radiography, medical imaging, radiation therapy for cancer etc.

[4] Carbon-14 dating, restoration or analysis of artworks (X-ray) etc.

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improve cooperation by States supplying such sources, to achieve better end-of-life management once they are decommissioned.

1. Strengthen the international framework on radioactive source security

The international framework on radioactive source security is derived from international conventions[5] and, above all, from technical IAEA recommendations that are not legally binding,[6] reinforced by periodic reviews and implementation reports.

To date no assessment has been done of this framework to determine whether it covers all aspects of radiation safety, even though experience has shown that the relevant recommendations pay too little heed to end-of-life management of radiation sources. Moreover, discussions have been held at IAEA focusing on the advisability of developing an international convention on radioactive source security. An evaluation of the existing international framework will afford a better idea of its strengths and weaknesses, and so of how it may be adapted and expanded.

2. Encourage the phasing in of alternative technologies in place of those using high-activity sources

Technologies[7] to replace those using high-activity radioactive sources (HARS) are progressively being developed and rolled out in many different medical and industrial applications. These technologies can contribute to radiation safety by helping to reduce the global HARS inventory and hence the risk that such materials will not be subject to regulatory control.

Such technologies are of course not the only way of improving radiation safety, and they can only be widely used if they afford States and operators a technological or economic advantage. This effort to phase out HARS must also be conducted with respect for States' sovereign technological choices and in a non-prescriptive way. It should remain an incentive to support research and development, to work on the interpretation of the concept of "justification" of isotope technologies, as established by the IAEA, or to identify, and seek the best solutions to, the obstacles to the development and deployment of such technologies.

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[5] The International Convention for the Suppression of Acts of Nuclear Terrorism entered into force in 2007 and has 86 States parties. The Joint Convention on the Safety of Spent Fuel Management and on the Safety of Radioactive Waste Management (Joint Convention) applies to sources declared as radioactive waste (art. 3.2) and to the safe management of disused sealed sources (art. 28). It entered into force in 2001 and has 69 States parties.

[6] The Code of Conduct on the Safety and Security of Radioactive Sources and its associated text Guidance on the Import and Export of Radioactive Sources are not legally binding. 121 States have acceded to the Code and 88 to the Guidance. The Code and its Guidance are supplemented by the IAEA Safety Standards and Nuclear Security Series (NSS) Nos. 9, 11 and 14.

[7] Among the candidate technologies to replace HARS are those that use lower-activity sources with a shorter half-life, or recycled sources, or indeed non-ionizing technologies. An instance of this is the replacement, in France, of cobalt-60 blood irradiators with X-ray irradiators, which is expected to be complete by 2017.

3. Improve cooperation by States supplying such sources to achieve better end-of-life management

End-of-life management for high-activity sources could be improved, considering that because of economic and technical issues—relating in particular to divergent practices in commercial supply contracts and in the maintenance and conservation of records—sources are still at risk of being orphaned.[8] Hence, it would seem appropriate to strengthen cooperation among States supplying radioactive sources, so as to identify common practices whereby loss of regulatory control over radioactive materials may be avoided. That work should focus especially on export records and the legal and financial conditions for securing decommissioned sources.

4. Actions undertaken

France has taken an active role at the Nuclear Security Summit (NSS) with the goal of having a "gift basket" on radioactive source security adopted in which concrete measures on the three major topics mentioned above would be proposed. That project is still under discussion in the run-up to NSS 2016, during which it would be adopted. It will thenceforth provide a framework for radioactive sources, both at IAEA and in other forums (the G8 Global Partnership and, especially, the 1540 Committee) and bilateral or multilateral work formats.

Beginning in April 2015, France will also co-chair, with the United States, a technical meeting on alternative technologies to replace HARS. That meeting—bringing together a small number of States, but likely to grow—will identify technologies affording States and operators technical and economic advantages, obstacles to their wider use, and ways of simplifying their development and making them widely available.

Lastly, France is active in other forums, supporting in-situ securing or repatriation of orphaned radioactive sources (G8 Global Partnership) and providing requesting States with technical and legal assistance on radiological safety (1540 Committee). France is also working at the United Nations General Assembly and the IAEA General Conference to make sure radioactive source security is correctly dealt with in those bodies' resolutions: on nuclear security (IAEA/GC) and the safety and security of radioactive sources (UNGA).

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[8] This may be due to the inability to link sources to companies that have gone out of business, the absence of complete export records, the uncertainty over the legal status of decommissioned sources as regards the applicable export contract, the inadequacy of States' resources for properly securing decommissioned sources, etc.